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Kissing right? On the consistency of the head-turning bias in kissing

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The present study investigated the consistency of the head-turning bias in kissing. In particular we addressed what happens if a person who prefers to kiss with the head turned to the right kisses a person who prefers to kiss with the head turned to the left. To this end, participants ($N = 57$) were required to kiss a life-sized doll's head rotated in different orientations that were either compatible or incompatible with the participants' head-turning preference. Additionally, participants handedness, footedness, and eye preference was assessed. Results showed that a higher percentage of participants preferred to kiss with their head turned to the right than to the left. In addition, the right-turners were more consistent in their kissing behaviour than left-turners. That is, with the doll's head rotated in an incompatible direction, right-turners were less likely to switch their head to their non-preferred side. Since no clear relationships between head-turning bias and the other lateral preferences (i.e., handedness, footedness, and eye preference) were discerned, the more consistent head-turning bias among right-turners could not be explained as deriving from a joint pattern of lateral preferences that is stronger among individuals with rightward as compared to individuals with leftward lateral preferences.

Keywords: Head-turning; Kissing; Handedness; Footedness.

Güntürkün (2003) has recently made the intriguing observation that approximately twice as many couples turn their heads to the right as to the left when kissing (see also Barrett, Greenwood, & McCullagh, 2006).

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Güntürkün (2003) claimed that this head-turning bias in couples is yet another example of a behavioural asymmetry in human adults, but also emphasised that it takes two persons to kiss and that an individual's head-turning bias cannot be directly derived from kissing couples. All the same, following up Güntürkün's original observations, several studies in which participants had to kiss a doll's head have reported comparable head-turning biases (Barrett et al., 2006; Ocklenburg & Güntürkün, 2009). One upshot of the similar head-turning biases in kissing among individuals and couples is that, when a right-turner kisses a left-turner, they are equally likely to switch their head to the non-preferred side. That is, if the individual head-turning bias is two right-turners for each left-turner, then if couples form randomly, four of nine couples would consist of right-turners, one couple would consist of left-turners, and the remaining four couples would consist of a right- and left-turner. If right- and left-turners are equally likely to switch to the non-preferred side, then two of four mixed couples will turn their head to the right, resulting in six of nine couples "kissing right", which corresponds to a two to one bias among individuals (see Güntürkün, 2003, p. 711). But are right-turners really just as likely to switch to their non-preferred side as left-turners? In the present study we address this issue by asking what happens when two individuals with an incompatible head-turning preference kiss.

We hypothesised that, rather than being equal, the probability of turning the head to the non-preferred side would be higher among left-turners than among right-turners. This conjecture was based on the following reasoning. It is usually found that behavioural asymmetries are stronger for individuals with rightward lateral preference patterns as compared to individuals with leftward preferences. For example, right-handers are less inclined to show inconsistent hand preferences (e.g., they are less likely to use different hands for writing and throwing) than left-handers (Gilbert & Wysocki, 1992; McManus, Porac, Bryden, & Boucher, 1999; Peters & Servos, 1989; Searleman & Porac, 2003). In addition, right-handers are not only more consistent in using the dominant hand across a range of tasks, they are also inclined to more reliably use their dominant hand for one and the same task. For example, Gonzalez, Whitewell, Morrissey, Ganel, and Goodale (2007) recently reported that when putting a jigsaw puzzle together or creating different LEGO[®] models, right-handers showed a marked preference for using their dominant hand (i.e., approximately 80%), whereas left-handers used the right and left hands equally often. Because the lateralisation quotients for the right- and left-handed participants were similar, this difference in consistency of hand preference cannot simply be attributed to differences in the degree of lateralisation. Hence, we hypothesised that if head-turning preferences in kissing are in some way related to other lateral preferences involving the hand, foot, eye, and ear, then right-turners are

more likely to persevere in turning the head to their preferred side than left-turners. Indeed, it seems reasonable to argue that a joint pattern of lateral preferences exists. Hepper, Welch, and Lynch (2005; but see De Vries, Wimmers, Ververs, Hopkins, & Savelsbergh, 2001) hold that a joint pattern of lateral preferences is established very early in human development; that is, already before birth. Güntürkün (2003; see also Michel, 1981) points to the lateralised (i.e., right-sided) head position in foetuses at 38 weeks gestational age (Ververs, De Vries, Van Geijn, & Hopkins, 1994) as the common precursor of postnatal lateral preferences for the hand, foot, and head. Yet the empirical support for the relationship between head-turning preference in kissing and other behavioural asymmetries such as handedness and footedness has been equivocal (Barrett et al., 2006; Ocklenburg & Güntürkün, 2009).

In the present study participants were asked to kiss a life-sized doll's head that was rotated in different orientations, thereby mimicking right- and left-turning partners. We were especially interested in what happens if participants kiss the doll's head when it is turned in a direction that is incompatible with the participant's preferred head-turning side (i.e., when right-turning participants kiss a left-turned doll's head and vice versa). We hypothesised that if head-turning bias in kissing does indeed share characteristics with other behavioural asymmetries such as handedness and footedness (Güntürkün, 2003), then right-turning kissers will show more consistent head-turning behaviour. Specifically, in the case of incompatible orientations of the doll's head, right-turners are expected to be less likely to turn to their non-preferred side than participants who preferably kiss with their head turned to the left. The relationships between lateral preferences for the hand, foot, and eye on the one hand, and the head on the other hand were also further scrutinised. Previous descriptive research based this analysis on a single kiss, yet the present experimental design also allowed us to take the consistency of the head-turning bias into account.

METHOD

Participants

A total of 57 adults (40 females and 17 males) aged between 18 and 33 years of age and living in the Amsterdam region (The Netherlands) volunteered to participate. The participants had normal or corrected to normal vision and were naïve as to the purpose of the experiment. The experiment was conducted in accordance with the ethical guidelines of the Faculty of Human Movement Sciences in Amsterdam.

Apparatus

Participants were asked to kiss a life-sized symmetrical plastic doll's head (in its previous life, the plastic head served as a model for students at a hairdressing school) that was mounted on a height-adjustable tripod and positioned in front of a plain white wall of the laboratory. The height of the plastic head was adjusted so that its nose was at the same height as the individual participant's nose. A hinge allowed the plastic head to be turned in one of seven fixed orientations with the point of rotation coinciding with the centre of the mouth (Figure 1). Relative to the vertical axis, these orientations were 0° (i.e., with the virtual line between centre of the mouth and the nose aligned to the vertical axis), $+5^\circ$ (i.e., a five-degree rotation to the right), $+15^\circ$, $+25^\circ$, -5° (i.e., a five-degree rotation to the left), -15° , and -25° .

Procedure and design

The participants stood directly in front of the doll's head and were instructed to kiss the head's face on its lips in the same way as they would kiss another person. To determine their head-turning preference, all participants made a first kiss with the head oriented vertically (i.e., 0°). They then made a series of 35 kisses with each of the head orientations being presented five times in random order. Between trials the participants turned around while the experimenter changed the head's orientation. Upon completion of the experiment participants filled out Dutch versions of the Edinburgh Handedness Inventory (Oldfield, 1971) and the Waterloo Footedness Questionnaire Revised (Elias, Bryden, & Bulman-Fleming, 1998) to determine handedness and footedness. Finally, we used a hole-in-the-hand test (Miles, 1930) to determine eye dominance.

Data analysis

Each kiss was first categorised as either a kiss to the right or a kiss to the left. A kiss to the right was defined as (i) a rightward lateral flexion of the head at



Figure 1. The plastic head in seven orientations. From left to right, the 25° , 15° , and 5° to the left, the 0° or neutral, and the 5° , 15° , and 25° to the right orientations. [To see a colour version of the Figure, please visit the online version of the journal.]

the upper cervical spine (Ocklenburg & Güntürkün, 2009), and (ii) the participant's nose being positioned to the right of the head's nose (i.e., from the participant's perspective). Each of these two criteria was scored separately by two experimenters, the agreement between the two scores being 95.1%.

We then classified each participant as either a right-turner or a left-turner based on whether the first kiss with the head oriented vertically was to the right or left. In four participants the experimenter was indecisive about the direction of lateral flexion and scored no-flexion. These participants were categorised based on their nose positioning only. Chi-square tests were used to examine whether the number of right- and left-turners were significantly different and whether head-turning preference was related to gender. Next, for each of the seven orientations the percentage of kisses to the preferred side (i.e., a kiss to right for right-turners and a kiss to the left for left-turners) was calculated. Hence, each of five kisses for a particular orientation to the preferred side counted for 20%. The kisses for which the experimenter was indecisive, and no-flexion was scored, were counted for 10%. To determine the stability of head-turning bias as function of the participants' preferred kissing side, the percentage of kisses to the preferred side was compared for the different head orientations. To this end the head orientations were relabelled as either a compatible (i.e., $+25^\circ$, $+15^\circ$, and $+5^\circ$ orientations for right-turners and the -25° , -15° , and -5° for the left turners) or an incompatible orientation (i.e., -25° , -15° , and -5° orientations for right-turners and the $+25^\circ$, $+15^\circ$, and $+5^\circ$ for the left turners). We then submitted the percentage of kisses to the preferred side to a 2 (group: right-turners, left-turners) \times 2 (gender: female, male) by 7 (orientation; compatible 25° , compatible 15° , compatible 5° , neutral 0° , incompatible 5° , incompatible 15° , incompatible 25°) analysis of variance with repeated measures on the last factor. Tukey HSD tests were used to compare differences between means.

Finally, laterality quotients (i.e., LQ) for handedness and footedness were calculated. For LQs ranging between $+100$ and 0 , participants were categorised as right-sided, whereas for LQs ranging between 0 and -100 participants were categorised as left-sided. Subsequently, chi-square tests were used to determine whether the number of right- and left handers, the number of right- and left-footers, and the number of right or left eye dominant participants were differentially distributed among right- and left-turning kissers. Using independent *t*-tests we also compared the mean LQs of handedness and footedness for the right- and left-turners. Finally, Pearson correlations between LQs for handedness and footedness and head-turning bias, as indicated by the percentage of kisses to the right for the 0° orientation, were calculated to determine the strength of the relationships among these variables.

RESULTS

Based on their first kiss with the plastic head in the vertical orientation, 41 participants (i.e., 71.9%) were classified as right-turners and 16 (i.e., 28.1%) as left-turners. This difference was significant, $\chi^2(1) = 10.97$, $p < .01$. The prevalence of right-turners was larger among women (i.e., 80%) than men (i.e., 52.9%), $\chi^2(1) = 4.33$, $p < .05$.

Figure 2 illustrates the percentage of kisses to the preferred side for the right-turners and left-turners as a function of the head's orientation. It shows that participants chose to kiss to their preferred side for the compatible head orientations, but tended to switch to their non-preferred side for incompatible orientations. Interestingly, it seems that the right-turners were more consistent in turning their head to their preferred side than the left-turners. That is, the right-turners switched later to their non-preferred side than

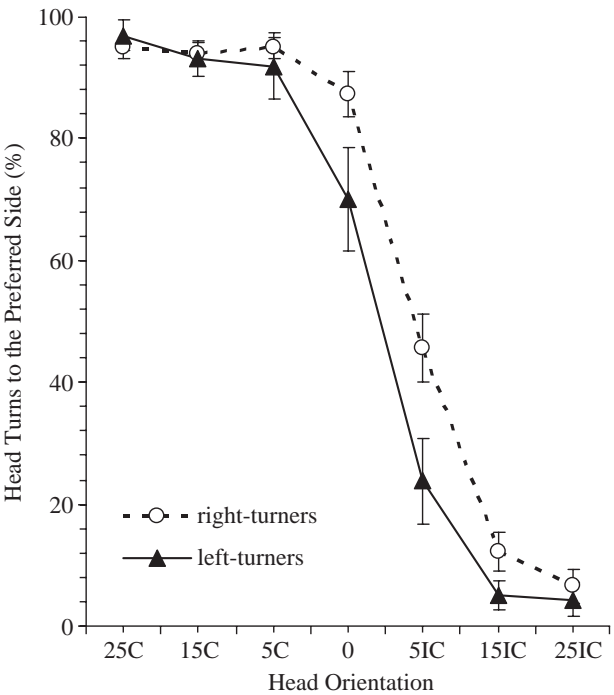


Figure 2. The percentage of head turns to the preferred side as a function of head-turning bias and head orientation (and SE). Note, “25C”, “15C” and “5C” refer to orientations of the doll’s head in the direction compatible with the participant’s head-turning bias (e.g., 25° to the right for right-turners and 25° to the left for left-turners) and “5IC”, “15IC” and “25IC” refer to orientations of the doll’s head in the direction incompatible with the participant’s head-turning bias (e.g., 25° to the left for right-turners and 25° to the right for left-turners). “0” refers to the vertical orientation.

left-turners. This was substantiated by significant effects for group, $F(1, 55) = 4.45$, $p < .05$, orientation, $F(6, 318) = 185$, $p < .001$, and group \times orientation, $F(6, 318) = 2.29$, $p < .05$. Tukey HSD post hoc analyses indicated a difference between groups for the neutral 0° and incompatible 5° orientations. No effects for gender were found.

There were no significant differences in handedness, $\chi^2(1) = 0.0003$, *ns*, footedness $\chi^2(1) = 2.14$, *ns*, and eye dominance, $\chi^2(1) = 0.14$, *ns*, among the right- and left-turning kissers. That is, the lateral preferences for hand, foot, and eye were equally distributed among right- and left-turners (Figure 3). Likewise, right-turning kissers had similar mean LQs for handedness, $t(55) = 0.17$, *ns*, and footedness, $t(54) = 0.98$, *ns*, as left-turning kissers (i.e., LQs for handedness were 64.3 and 68.1, LQs for footedness were 37.0 and 53.1 for right- and left-turners respectively). Finally, whereas the participants' LQs for handedness and footedness showed a moderate but significant relationship, $r(56) = .59$, $p < .001$, neither the LQ for handedness, $r(57) = .06$, *ns*, nor the LQ for footedness, $r(56) = .13$, *ns*, significantly correlated with the participants' head-turning bias as indicated by the percentage of kisses to the right in the neutral 0° orientation.

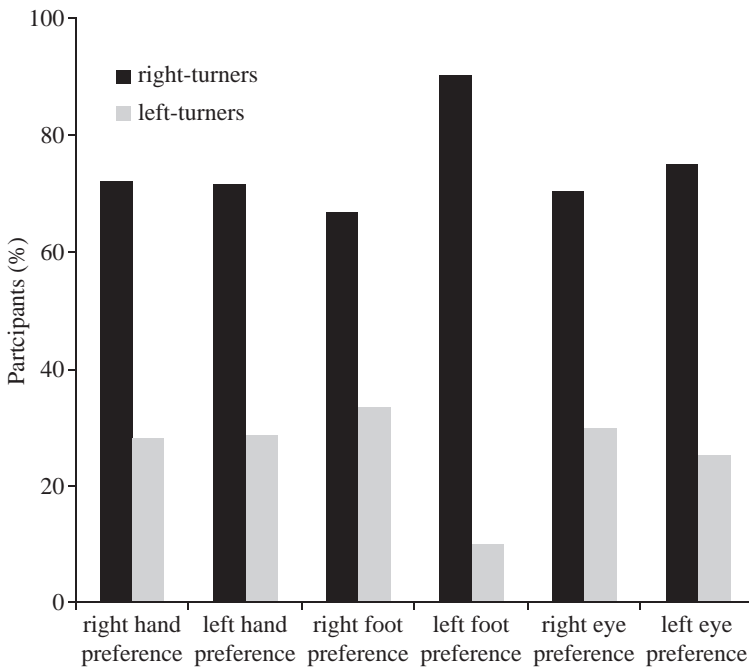


Figure 3. The percentage of participants who have a right or left preference for the hand, foot, and eye as a function of head-turning bias.

DISCUSSION

The present study reproduced earlier observations of a rightward head-turning bias during kissing in human adults. With 72% of the participants preferring to turn their head to the right side, our study falls right in-between previous reports of 62–63% (Güntürkün, 2003; Ocklenburg & Güntürkün, 2009) and 78–80% (Barrett et al., 2006). Importantly, the present study extends these previous observations by demonstrating that the head-turning bias in kissing among right-turners is stronger than among left-turners. That is, right-turners were more likely to persist in turning their head to their preferred side, even if the doll's head was rotated in an incompatible direction (i.e., as if kissing to the left side). Consequently, when two persons with an incompatible head-turning bias kiss, they are more likely to turn their head to the right than to the left.

We indeed expected that the right-turners would be more consistent, but we might have done so for the wrong reasons. Our expectations were based on the assumption of a joint pattern of lateral preferences for the hand, foot, head, and eye functions (see Güntürkün, 2003). In support of this contention was the observation that the right-turning preference was more prevalent among women than among men (cf. Ocklenburg & Güntürkün, 2009). Such gender differences have also been reported for handedness (McManus, 2002). Yet we were not able to substantiate that lateral preferences for turning the head were related to lateral preferences for using the hand, foot, and/or eye, although we did find the commonly observed relationship between handedness and footedness (e.g., Brown & Taylor, 1988). Nonetheless, with the relatively low number of participants in the current study, the probability is high that a difference for lateral quotients for hand, foot, and/or eye between right- and left-turners is *not* detected. Hence, based on the present study alone one must be particularly careful in concluding that a joint pattern of lateral preferences that includes head-turning does not exist. We therefore also probed the presence of a relationship between head-turning preference and hand- or foot preferences by combining all the data reported to date. On their own, these reports led to contradictory conclusions. Barrett et al. (2006) failed to show a relationship, whereas Ocklenburg and Güntürkün (2009) claimed that right-turning kissers were indeed more likely to favour using the right hand (and foot) than left-turning kissers. Table 1 reports the pooled data from the three studies. Calculation of chi-square tests revealed that the number of right- and left-handers, $\chi^2(1) = 2.68$, $p = .10$, and the number of right- and left-footers, $\chi^2(1) = 0.242$, $p = .62$, were equally distributed among right-turning kissers as compared to left-turning kissers. Further research on the relationships between behavioural asymmetries is required to reach a definite verdict. In doing so, it may be worthwhile to also include additional

TABLE 1
Relationships of head-turning preference with hand and foot preference

<i>Head-turning preference</i>	<i>Hand preference*</i>		<i>Foot preference**</i>	
	<i>Right-hander</i>	<i>Left-hander</i>	<i>Right-footer</i>	<i>Left-footer</i>
Right-turner	281	29	110	59
Left-turner	117	20	20	13

*Frequencies based on the current study ($N=57$), Barrett et al. (2006, $N=240$), and Ocklenburg and Güntürkün (2009, $N=150$).

**Frequencies based on the current study ($N=52$; one participant did not complete the footedness questionnaire, whereas four others had LQs that equalled zero), and Ocklenburg and Güntürkün (2009, $N=150$).

head-turning behaviours (e.g., drinking water from a dripping tap without using the hands) so as to derive a more continuous measure for head-turning. Nonetheless, the present analyses suggest that multiple independent lateral specialisations exists for head, hand, foot, and eye functions. This is reminiscent of an earlier proposal by Peters that inconsistent hand preference patterns may be due to divergent lateralisation of arm (i.e., throwing) and hand (writing) functions (Peters, 1990; Peters & Pang, 1992; Peters & Servos, 1989).

We conclude that, at this point, there is insufficient evidence for the hypothesis that the more consistent head-turning bias observed in right-turners as compared to left-turners stems from a joint pattern of lateral preferences in human adults. Hence, besides further investigations into the relationships between head-turning and other lateralised functions, alternative ideas need to be addressed as well. In this respect the proposal of a left-hemisphere specialisation for visuomotor control may be of relevance (Corballis, Funnell, & Gazzaniga, 2000; Gonzalez, Goodale, & Ganel, 2006). Gonzalez et al. (2006), for instance, found that precision grips performed with the right hand showed greater robustness against perceptual-cognitive perturbation than grips performed with the left hand, irrespective of the participants' handedness (cf. De Grave, Brenner, & Smeets, 2009). The authors conclude that the networks for visuomotor control are more encapsulated in the left hemisphere. This would suggest that in left-handers visuomotor control necessitates more interhemispheric interaction than in right-handers, which might make inconsistent preference patterns more likely (Gonzalez et al., 2007). It is unknown, however, whether besides prehension this left-hemisphere specialisation for visuomotor control also includes head-turning behaviours. Alternatively, in analogy with the right shift attempts faced by left-handers (Annett, 2000), it may be the case that right shift pressures experienced by left-turning kissers are stronger than left

shift pressures experienced by right-turning kissers, simply because the leftward head-turning preference is less prevalent in adults. Therefore, left-turners may be more likely to kiss a person with an incompatible head-turning bias than right-turners, and thus may switch more frequently (in absolute terms) to their non-preferred side, even if the likelihood to do so is equal among left- and right-turners.

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